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09/883,481	06/18/2001	Yuichi Takamine	36856.493	1199

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 10/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,481

Applicant(s)

Takamine et al.

Examiner

Barbara Summons

Group Art Unit

2817

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 (three) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☐ Responsive to communication(s) filed on _____
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-24 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-4, 7-12, 15-18 and 20-24 is/are rejected.
- ☒ Claim(s) 5, 6, 13, 14 and 19 is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☒ The drawing(s) filed on 6/18/01 is/are objected to by the Examiner
- ☒ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☒ All ☐ Some* ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

Art Unit: 2817

DETAILED ACTION

Drawings

1. Figures 8, 18 and 30 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (see e.g. pg. 1, lns. 18-20; pg. 7, lns. 25-26; and pg. 8, lns. 28-30). See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because in Fig. 13, the reference label "13j" should correctly be --13i-- because "13j" is shown in Fig. 14 (see page 21, lns. 10-16). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR § 1.84(p)(4) because reference character "1" has been used to designate both the "surface acoustic wave device" (see Fig. 1 and pg. 22, the fifth line from the bottom and the "cover material" (see Fig. 15 and pg. 22, the third and fourth lines from the bottom. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Art Unit: 2817

Specification

4. The disclosure is objected to because of the following informalities: On page 12, lines 5 and 6 are unclear because " λm " has not been defined, and because " λI " is defined as both the wavelength of the interdigital transducer (IDT) and the wavelength of the reflector. Clarification is required, and appropriate correction is required.
5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR § 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification does not provide antecedent basis for a surface acoustic wave (SAW) device "wherein the bonding wire constitutes the capacitance component" (emphasis added) as recited in claim 23.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claim 23 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 is unclear because it is unclear how a "bonding wire" can provide a "capacitance component" (see lines 6-7). A bonding wire is known in the art to provide an inductive

Art Unit: 2817

component. There is no antecedent basis for this limitation in the specification nor is there any figure showing how a bonding wire is intended to provide a capacitance, and therefore, the claim cannot be understood in light of the specification .

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-4, 7-12, 15 and 16 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ueda et al. U.S. 5,874,869.

Fig. 14 of Ueda et al. discloses a SAW device comprising: a piezoelectric substrate 1; at least one IDT (11A-C, 21A-C) disposed on the substrate; an input end and an output end connected to the at least one IDT, at least one of the input/output ends including a pair of balanced signal terminals (i.e. the bonding pads of IDT 21B); and at least one of a delay line and a reactance component (i.e. bonding wires 222 and 223, which inherently provide an inductive reactance component) is connected to each of the pair of balanced signal terminals and to the electrode pads 204 and 206 of the package (see claims 7 and 15). Regarding claim 9, the at least one of the delay line and reactance component are inherently different from each other due to the different lengths of bonding wires 222 and 223. In other words, the structure of Fig. 14 of Ueda

Art Unit: 2817

et al. is the same as Applicants' Fig. 15, as far as the bonding wires to the balanced signal terminals are concerned, and so the delay line/reactance component properties are considered to be the same.

Regarding claims 2-4 and 10-12, the SAW device is comprised of two longitudinally coupled type resonator filters, and there is no electrically neutral point between the balanced signal terminals (i.e. the bonding pads connected to IDT 21B) on the piezoelectric substrate. Regarding claims 8 and 16, the device is disclosed as used in a communication device (see e.g. col. 1, lns. 13-20).

10. Claims 17, 20, 21, and 24 are rejected under 35 U.S.C. § 102(b) as being anticipated by Xu et al. U.S. 5,821,834.

Figs. 3 and 7 of Xu et al. disclose a SAW device (12 in Fig. 3) comprising: a piezoelectric substrate 16 (Fig. 7); at least one IDT (T in Fig. 7) disposed on the substrate 16; at least one of the input and output ends of SAW device 12 including a pair of balanced signal terminals; and a capacitance component 14 (Fig. 3) formed in the area D (Fig. 7) is connected between the pair of balanced terminals at the output end of SAW device 12. Regarding claim 20, there is no electrically neutral point between the balanced terminals. Regarding claim 21, Fig. 8 shows that the capacitance component is provided by microstrip lines 32 and 34 provided on the piezoelectric substrate 16. Regarding claim 24, the SAW device is a filter which is used in a communication device (see the abstract, lns. 5-6).

Art Unit: 2817

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 18 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Xu et al. U.S. 5,821,834 taken alone.

Xu et al. discloses the invention as discussed above, except for disclosing the SAW device being a longitudinally coupled resonator type SAW filter having at least three IDTs, or the SAW device being mounted face down in a package.

The Examiner takes Official Notice the face down mounting of SAW devices via conductive bumps would have been extremely well known in the art as an art recognized alternate mounting means to the face up mounting of SAW devices via wire bonding. [See other art of record cited below as evidence].

Art Unit: 2817

Regarding the longitudinally coupled SAW device, Xu et al. explicitly suggests that the capacitance component between balanced terminals be used with other types of SAW filters (see col. 4, lns. 54-58). [See also other prior art of record cited below].

Consequently, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW device of Xu et al. (Figs. 3, 7, and 8), if even necessary, such that it would have been face down mounted in the package, because Xu et al. discloses only the package (see col. 4, lns. 51-53) and is silent as to the specific mounting method, thereby suggesting to one of ordinary skill that any well known method, such as face down mounting via conductive bumps, would have been usable therewith, and because face down bonding would have provided the advantageous benefit of avoiding parasitic coupling of the bond wires to IDTs they may cross as would have been known by one of ordinary skill in the art. [See also other prior art of record cited below].

It would have been further obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW device of Xu et al. such that it would have been formed with longitudinally coupled resonator type SAW filters with at least three IDTs instead of the waveguide coupled type SAW resonator filters, because Xu et al. specifically suggested using other types of SAW filters (see col. 4, lns. 54-58) which one of ordinary skill would have known included the well known longitudinally coupled type SAW resonator filters.

Art Unit: 2817

Allowable Subject Matter

13. Claims 5, 6, 13, 14, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest a SAW device having each of the explicitly recited features and especially having "a microstrip line provided on one of the package and the piezoelectric substrate, wherein the microstrip line constitutes at least one of the delay line and the reactance component" (see claims 5 and 13) connected to the balanced signal terminal. Additionally, the prior art of record to Xu et al. shows the capacitance element coupled to the balanced output of a single first stage SAW filter or balanced input of a single second stage SAW filter only. That is, there is no suggestion to provide the capacitance component at the input or output of a SAW device comprising a plurality of two or more SAW filters (claim 19).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Dai et al. U.S. 5,790,000 discloses many alternate arrangements of the IDTs (including split IDTs in Fig. 7) in longitudinally coupled SAW resonator type filters for providing balanced signal terminals on at least one of the input and output sides of the filter. Dai et al. also provides

Art Unit: 2817

evidence that it is well known to couple longitudinally coupled SAW resonator filters in the same manner as waveguide coupled SAW resonator filters (see e.g. Fig. 9).

Kawachi et al. U.S. 6,388,545 B1 provides evidence that it is well known to mount SAW devices either face down with conductive bumps or face up with wire bonding (see e.g. Figs. 10 and 12 for face down and Figs. 28 and 29 for wire bonding).


Kawase et al. U.S. 6,339,365 B1 provides evidence that the advantages of face down bonding of SAW elements over wire bonding would have been known by one of ordinary skill in the art (see e.g. col. 1, lns. 54-64).

Taguchi et al. U.S. 5,847,626 discloses (Figs. 1 and 2) another type of SAW filter device with balanced output signal terminals 107 and 108 each having an inductive reactance component 109-1 and 109-4 connected thereto.

Tada U.S. 5,994,980 discloses (see Figs. 1, 3, 6, 9, 14, and 15) other SAW filter devices with balanced output signal terminals (i.e. the bond pads on the piezoelectric substrate that are connected to the package electrodes 9a and 9b) and inductive reactance components (bonding wires) connected to each of the balanced signal terminals.

16. Any inquiry concerning this communication should be directed to Barbara Summons at telephone number (703) 308-4947, FAX no. (703) 308-7724, receptionist's no. (703) 308-0956.

bs
September 30, 2002


Barbara Summons
Patent Examiner
Art Unit 2817